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Note on the Spectrum of Nova Aurigæ. By E. W. Maunder.

The appearance of the new star discovered by Dr. Anderson near χ *Aurigæ* happened at a most unfortunate time for spectroscopic observation at the Greenwich Observatory, since the old 12¾ inch refractor had been dismounted some months, and its successor, the 28-inch, had not come to hand. There was, therefore, at the time no telescope available to which either of the spectroscopes of the Observatory could be applied. Under these circumstances the best course appeared to be to try and utilise the object-glass prism presented to the Observatory by Sir Henry Thompson, and the Astronomer Royal directed me to attach it to the 9-inch photographic telescope which the same donor had also given. As, however, that telescope had been employed for a different work, and as, therefore, the prism had never been tested with it, several serious difficulties were encountered, and, partly owing to the delays thus caused, and partly to the continued cloudy weather, which greatly hindered the work of adjustment, it was not until February 18 that any exposure could be made upon the Nova, and this was rendered useless by the cloudy state of the sky. On February 22 an exposure was, however, made more successfully, though two serious drawbacks prevented the photograph being a sharp one. The first difficulty was that the telescope-tube was not long enough to get a good focus, and the second that the enormous weight of the Lassell telescope, to which the Thompson instrument is attached, causes it to flex to a marked amount when off the meridian, and hence the star can with difficulty be made to preserve the same position in declination during a long exposure, and of course any drift in declination must be fatal to the definition of the lines.

The plate, to which an exposure of 70 minutes was given, however, shows the more pronounced lines in the spectrum, though, for the reasons above mentioned, their definition is only poor. A preliminary measurement and reduction of the photograph give the following positions for the lines :—

Line.	Bright lines.	Dark lines.
	4919	
F	4860	
	4629	
	4580	
	4547	
	4510	
	4472	
G	4340	4316

Line.	Bright lines.	Dark lines.
	4229	4212
	4174	4155
h	4101	4085
H	3968	3953
K	3933	3913
α	3887·5	
β	3834	

The bright lines due to hydrogen were recognised by their correspondence in position with the dark lines in the spectrum of *β Tauri*, which was photographed in close proximity to that of the Nova, and Dr. Huggins's values have been adopted for their wave-lengths. The positions of the other bright lines, and of the dark lines, have been computed from the measures by the use of an interpolation formula.

The mean displacement of the dark lines relative to the corresponding bright lines was 18·3 tenthmetres, and corresponds to a motion of relative approach of 820 miles a second. This is probably a considerably exaggerated value, the want of fine definition in the photograph rendering the measures necessarily rough, and tending to exaggerate the measures of displacement.

On the same evening, and with the same instrument, I succeeded in obtaining a view of the visual part of the spectrum. A positive eye-piece of magnifying power about 80 was used. The spectrum was bright, and five bright lines were seen in the green, one in the orange, one in the extreme red, and two lines between these two last named. Other bright lines were also seen in the blue, but these were clearly those seen in the photograph.

Of the lines in the green, the first was clearly the F line; and the second, proceeding in the direction of the less refrangible rays, was the line measured on the photograph as at λ 4919.

Adopting the interval between these two lines as unity, that between the second and third was estimated as about 1·4 (for, of course, no measures could be made), between the third and fourth as 2·4, and between the fourth and fifth as 2·0. This would make the fifth line not far from E, the fourth line near *b*, but further towards the blue, and the third line very near the chief nebular line. So rough an estimation, of course, leaves it quite an open question as to whether these lines really coincided with the lines named or not. The line supposed to be near E appeared to be a diffused band, rather than a sharply defined line.

The line in the extreme red, supposed to be C, was very bright; the line in the orange, supposed to be D, was less so; the two which lay between C and D were less bright.

This occasion, February 22, was the only one in which I have had the opportunity of examining or photographing the spectrum

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of the Nova, and the instrument referred to, the Thompson photographic telescope, aperture 9 inches, with a prism of 15° before the object-glass, was the only instrument I was able to employ.

Blackheath:
1892 *March* 11.

Photograph of the Region of Nova Aurigæ.
By Isaac Roberts, F.R.S.

The region of *Nova Aurigæ*, with R.A. 5^{h} 25^{m}, and Decl. + 30° 21′ as the centre, was photographed with the 20-inch reflector on the night of February 5, which was the first night with a clear interval, after the receipt of the Edinburgh Circular No. 22 announcing the discovery. Since that date the photographs described in the sequel have been taken.

The photograph now presented is an enlargement to the scale of one centimetre to four minutes of arc from a negative taken on February 18 with an exposure of three hours. The plate was so placed in the reflector that the star D.M. No. 899, Zone 30°, mag. 6·2, should be simultaneously photographed with the Nova, and on two plates the star 26 *Aurigæ* was photographed with the Nova.

The photographs obtained have been examined by aid of the pantograver, and the photo-images of the Nova, of D.M. No. 899, and of 26 *Aurigæ* measured to 0·0001 of an inch diameter. The results are given in the following table:—

Table of measured Photo-diameters.

Date when Negative was taken.	Duration of exposure of Negative.	Diameter of Nova.		Diameter of D. M. No. 899, Zone 30 degrees.		Diameter of 26 Aurigæ.	
		In parts of an inch.	In seconds of arc.	In parts of an inch.	In seconds of arc.	In parts of an inch.	In seconds of arc.
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Feb. 5	45^{m}	0·0169	34·9	0·0174	35·9	...	...
13	15^{m}	·0137	28·3	...	...	0·0142	29·3
13	5^{m}	·0128	26·5	...	...	·0127	26·3
18	3^{h}	·0217	44·7	·0203	41·9	...	...
22	20^{m}	·0137	28·1	·0152	31·4	...	...
22	5^{m}	·0130	26·8	·0146	30·0	...	...
25	5^{m}	·0130	26·8	·0147	30·2	...	...
25	20^{m}	·0142	29·3	·0144	29·7	...	...

The following observations upon the appearance of the photo-image of the Nova and of the comparison stars were made during the examination of the negatives under a magnifying power of 24 diameters.